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(54) IMPROVEMENTS IN AND RELATING TO TELEPHONE SYSTEMS

(71) We, ANDERS EDVARD TRELL, a Swedish subject of Hornsgatan 29, S-116 49 Stockholm, Sweden, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a telephone system having a telephone set arranged outside the entrance of an apartment house or any other entrance and connected to the public subscriber telephone network, such that visitors can communicate with a desired tenant when the entrance door is locked by means of said telephone set, that is "the entrance telephone set", by calling the subscriber telephone set, that is "the reply telephone set", of the desired tenant, or possibly the caretaker or any other person authorised to open the entrance, the connection thus accomplished via the telephone network and the reply telephone set, apart from a means of verbal communication, also enabling the answering party to initiate the opening of the entrance door from the reply telephone set.

The number of locked entrances is steadily increasing, causing great disadvantages for tenants as well as visitors. Devices such as local intercom systems can be installed, arranged to allow passage. However, these systems have a number of disadvantages, which, despite the fact that the entrance door can be kept locked, often prevent their installation. These systems require separate wiring between the main unit and each connected tenant unit, and each tenant unit must be arranged with a separate signalling source, verbal communication unit and impulse source for unlocking the entrance door. This makes the installation cost high and also increases the risk of malfunctioning. Irritation is often caused by unauthorised use or mistakes in the use of call button panels, which are often difficult to visualize and read, and which cause irritation by giving an immediate signal in the associated receiver unit when a call button is depressed.

A limited number of systems have been suggested, using the tenants subscriber tele-

phone sets and part of the line network, but these systems cannot operate in such a way that the advantages of the automatic public subscriber telephone network with the capacity of communication are used, thus maintaining a number of the previously mentioned disadvantages. One of these previously known systems also requires a separate intercom wiring for the communication between entrance and the tenants, which increases the cost of installation. Another type of previously known system requires separate switch and control units in the telephone exchange for each connecting building, separated from the public network equipment, said separate equipment having fixed connections to each of the outgoing terminals for every subscriber in the building concerned. If a large number of such systems are to be connected to a telephone exchange, a rather complicated switching technique must be adopted, thus increasing the cost of installation. Both mentioned systems can also be used for unauthorised calls or calls by mistake which might be of less importance in buildings with a lobby, but could be of considerable importance in apartment houses having an entrance facing the street. In most houses or buildings, the cost of installation is also of utmost importance.

It is a known fact of to-day, that the general public have access in their homes to a well-functioning, selective system of communication, including wiring, switching devices, signalling means, verbal communication unit and also a good service, i.e. the public automatic subscriber telephone network with a connected subscriber telephone set, which can be installed at a modest cost for those not presently using this service.

According to the present invention there is provided apparatus having connecting means by which the apparatus is connectible to a door lock comprising switching means adapted to connect said apparatus by a telephone line directly to an exchange of a public automatic subscriber telephone system, selecting means for dialing telephone numbers to said telephone network, discriminating means for securing that only cer-

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tain dialled telephone numbers can be transmitted by said selecting means whereby in use said telephone network makes a call to one of the telephone network subscriber sets, thereof having one of said certain numbers, means for verbal communication with said subscriber set and means responsive to signals induced by said subscriber sets having said certain numbers for causing release of said door lock.

Further according to the present invention there is provided apparatus in which said selecting means comprises signal generating means for producing signal characters not initially forming telephone numbers but subsequently to be transformed to telephone numbers.

An embodiment of the present invention will now be described by way of example only with reference to the accompanying schematic drawing of a telephone system.

In the following description the devices, techniques, apparatus, etc., utilised by the G.P.O. or equivalent conventional automatic subscriber telephone networks at the time of writing the Specification have been assumed to exist and be available for utilisation with the present invention.

A standard set including a conventional dialling means and a loudspeaker or hand set, a verbal communication unit, and possibly a camera unit if a video telephone network has been established, that is "the entrance or lobby set", is installed at the entrance accessible for visitors, and connected by the telephone authorities to the existing public telephone network as an ordinary subscriber telephone set. This set does not need a subscriber number, but it is possible normally to dial any number. Normally, this set is disconnected from the telephone network by means of a line power switch, which is connected by a visitor wishing to make a call. By means of the number selecting device, the visitor can now establish contact via the subscriber telephone network with any tenants ordinary subscriber telephone set, that is "the reply set". The switch indicated as 1 in the enclosed drawing is in position I during this operation.

A visitor can dial any number within the public telephone network. However, for intercom signalling purposes only certain telephone numbers are relevant, that is numbers inside the entrance. Thus, a number discriminator, is included, restricting the use of the entrance set to relevant telephone numbers only. The discriminator can be programmed for any numbers and instructed to pass on only programmed numbers. This device is preferably programmed by the G.P.O. engineers for the numbers relevant to each entrance, which means that out of millions of combinations, the number dialled at the entrance set must strictly conform

with a programmed number, if a call is to be connected to the telephone network. This system protects the G.P.O. from the set being used for ordinary telephone calls. It also includes protection for the tenants from unauthorised calls. If no panel displaying the names and telephone numbers is arranged by the entrance set, the visitor must know who lives behind the entrance and/or the telephone number, before a signal to a tenant can be accomplished. Tenants having secret telephone numbers can maintain this protection, and tenants with no desire to communicate with visitors, can still have a telephone set, if their telephone numbers are not programmed or removed.

From what has been stated above and particularly in view of what will be disclosed below, it will be seen that primarily, it is the number restriction facilities which make it possible to utilise the entrance telephone set for a specific purpose and building, despite the fact that it is connected in a conventional way to the existing public subscriber telephone network. It should also be appreciated that the number discriminator can be designed according to numerous technical solutions. The number discriminator can be connected in parallel with the number selecting device as a "passive" component, i.e. switching the dialled number to the exchange, simultaneously checking each digit and disconnecting the call after any wrongly dialled digit, in which case the switching capacity of the telephone network might be overloaded by many unauthorized number selecting operations. It can also be connected in series as an "active" component, i.e. first checking/approving the selected number, thereafter repeating the approved telephone number to the switching exchange. In this case, the switching capacity of the telephone network is only loaded with authorized switching operations, which is preferred, particularly in view of the advanced LSI-technique now available, making it possible to convert key set dialled numbers to a conventionally dialled number if required, and which circuits have a programmable memory capacity for storage of approved telephone numbers, which, after dialling from a key set, are repeated to the switching exchange. Such a circuit can also be addressed from a conventional name/signalling panel and dial a programmed number depending on the signalling key depressed, but such a system can be used by unauthorized persons and mistakes caused by depression of the wrong key can also occur. Preferably, the ordinary subscriber telephone numbers are used for signalling purposes from the entrance, since they are known to all welcome visitors. For certain tenants, e.g. doctors, firms offices, keys for short number selection can be ar-

ranged for addressing the number discriminator. The method for number selection can thus be arranged to suit every type of building in the most convenient way. Moreover the number discriminator also can be arranged outside the actual entrance telephone set, without leaving free access to the full switching capability of the telephone network.

Any wrongly dialled number is prevented from passing on, or the network switch is caused by the number discriminator to immediately disconnect the entrance telephone set from the telephone network, which connection, possibly after a predetermined period of time as shown later, can be re-established by a visitor for a new number selecting operation. If the selected number conforms with a number programmed in the number discriminator, an ordinary telephone signal is caused in the appropriate reply telephone set. When a person lifts the hand set belonging to this telephone, verbal communication is established, i.e. request for entrance, identification etc., but a two-way electrical contact suitable for other signalling purposes is also now established between the entrance and the reply telephone sets. There is no other method to establish contact between the subscriber telephone sets and an entrance telephone set other than by a call from the last mentioned set, since the entrance telephone set is not allocated a subscriber telephone number and is normally disconnected from the network. Hence only telephone sets with their telephone numbers programmed in the number discriminator of the entrance telephone set of all subscriber telephone sets in the public network, can induce any type of signal to the entrance telephone set concerned. If said set is arranged to be influenced by a signal, which can be created by any subscriber telephone set in the network, said influence can only be created from a restricted number of authorized subscriber telephone sets. The entrance telephone set is designed to receive a signal for entrance unlocking purposes, created by means of a reply telephone set, said signal being conventional and standard for all entrance telephone sets/reply telephone sets.

A suitable signal from a reply telephone set according to the described embodiment of this invention, could be the movement of the number selecting device to digit 9, thereafter releasing same within a short period of time without replacing the hand set. Thereby, a first type of signal is transmitted from the reply set to the entrance set on movement of the dial from the "at rest" position, followed by a repeated number of pulses of a second type, that is "dialling signals" and a repeat of the first type of signal.

A device, referred to as a "signal distinction unit A+B", included in the entrance telephone set, analyses after establishment of contact with a reply telephone set the above signal sequence, the unit A sensing the first signal type forming the first part of the sequence, causing unit A to move switch 1 shown in the drawing to position II. The remaining part of the signal sequence, being the pulses and the repetition of the first signal type, can now be sensed by unit B. Reception of the correct pulse sequence within a restricted period of time, followed by repetition of the first signal type, causes the lock impulse generator, which could be a relay, to generate an opening impulse which can be an electrical impulse to the (electrical) entrance lock connected to the lock impulse generator. When the release of the entrance door lock has been accomplished, the entrance telephone set returns to the initially described state.

The division of the signal distinction unit into two parts A+B, and the switch 1 shown in the drawing, are arranged to give protection against un-desired releases of the entrance door lock. Since the switch 1 must take up position II to enable unit B to receive signals, unit B cannot be manipulated in order to open the entrance from the verbal communication unit or the number selecting unit of the entrance telephone set. Since unit B must receive the correct pulse sequence within a restricted period of time, a disconnection of the call, e.g. caused by the called party hanging up, does not initiate the opening of the entrance. The called party can thereby refuse to open the entrance door. If unit B does not receive the correct pulse sequence within a short period of time, but an incorrect or no sequence at all, said unit can be designed to cause the network switch to disconnect the connection of the entrance telephone set from the telephone network, instead of initiating a pulse from the lock release impulse generator. The switch 1 is now returned to position I, possibly after a predetermined time delay, thus making it possible for the called party to reach the line without being prevented by repeated attempts to establish contact from the entrance from an unauthorized person.

Since the entrance telephone set is connected to the public telephone network, all extra services offered by this network to the subscribers can be utilised. Two of these services, presently used in certain areas, are "call waiting" and "code ringing". The first mentioned service is a particular signal in the hand set for a party on the line, if a third party is calling the engaged number, whereby the party on the line can take said call. The second service mentioned involves different signal characters for calls from

different types of subscribers. These services, to be introduced in many areas, can also advantageously be used for entrance telephone sets.

5 All functions described above can also be regarded as separate functions, interworking by means of electromechanical means, as well as arranged outside the entrance telephone set, but preferably arranged as one electronic unit, as indicated
10 in the drawing, thus permitting mass production at a low cost, since the units can be identical for all entrance sets, given a separate identity by the programming of the number restriction apparatus included in the device. This unit can also be powered
15 separately from a line source, as indicated in the drawing, and connected in such a way, that it is not used when the entrance door is kept unlocked. No dialled numbers or calls will then be connected to the telephone network.

Certain conditions of restriction can also be included in this unit, e.g. if the call time
25 should exceed for example one minute, if no reply has been received after 6 ringing tones, or 15 seconds after the last digit in an uncompleted number sequence, said conditions being to avoid malicious calls or mistakes. According to a separate embodiment, a number of entrances are simultaneously controlled from one entrance set, the number restriction apparatus selectively
30 guiding the release impulse for a lock on the basis of the information obtained from the dialled telephone number.

If desired, each entrance set can also be programmed to pass on a common number for all entrance sets in the area/city/etc.,
40 to be used by postmen, emergency personnel etc., when the opening of a locked entrance is desired, the entrance door lock being released by the called party. It is easily understood, that despite the fact that
45 said number can be selected from any entrance set, release of the entrance door lock will only be affected for the entrance from which the call is made.

50 WHAT I CLAIM IS:—

1. Apparatus having connecting means by which the apparatus is connectible to a door lock comprising switching means adapted to connect said apparatus by a telephone line directly to an exchange of a public automatic subscriber telephone system, selecting means for dialling telephone numbers to said telephone network, discriminating means for securing only certain
55 dialled telephone numbers can be transmitted by said selecting means whereby in use said telephone network makes a call to

one of the telephone network subscriber sets, thereof having one of said certain
65 numbers, means for verbal communication with said subscriber set and means responsive to signals induced by said subscriber sets having said certain numbers for causing release of said door lock.
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2. Apparatus as claimed in claim 1, in which said selecting means comprises signal generating means for producing signal characters not initially forming telephone numbers but subsequently to be transformed to
75 telephone numbers.

3. Apparatus as claimed in claim 2, wherein said selecting means comprises push buttons each associated with means for dialling a predetermined telephone number.
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4. Apparatus as claimed in claim 2, wherein said selecting means comprises dialling means.

5. Apparatus as claimed in any one of claims 1 to 4, including video communication means between said apparatus and said subscriber set.
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6. Apparatus as claimed in any one of the preceding claims, wherein said means responsive to signals induced by said sets, senses and responds to signals generated by a subscriber set when it is connected with said exchange by dialling a predetermined number.
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7. Apparatus substantially as hereinbefore described with reference to the accompanying drawing.
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8. A telephone system having a telephone set connected directly to the public subscriber telephone network, said entrance set
100 being arranged outside the entrance of an apartment house or any other entrance door and intended for the purpose of communication between a visitor and a party inside said entrance having a reply set, when
105 locked, the communication thus established via the subscriber telephone network between the entrance and the reply set also enabling the called party to initiate the release of the entrance door lock, in which
110 existing telephone numbers and telephone sets already possessed by the parties inside the building are utilised, said sets being conventionally connected by the public subscriber telephone network, the entrance set,
115 apart from including switching means by which it can be coupled by its own telephone line to the automatic exchange of said network unit being associated with an apparatus connected to the entrance door lock and
120 being adapted to sense signals generated by a reply set after establishment of telephone contact between the entrance set and said reply set, said signals causing the entrance door lock to be released, and being provided with a number discriminator device
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programmable with the telephone numbers
of the reply sets.

9. A telephone system substantially as
hereinbefore described with reference to
5 the accompanying drawing.

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COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of
the Original on a reduced scale.

